

STRONGYLIDÆ IN HORSES

IV. *GYALOCEPHALUS CAPITATUS*, Looss.

BY

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This species was described by Looss in 1900. A year later (1901) he amplified his earlier description, although his search for further material had been unsuccessful. As Looss had at his disposal but a single pair of copulating worms, which he had found in the colon of a mule in Egypt, his description is in some respects inadequate. So far as we are aware, no other account of this worm has been published.

The worm has been found by us in small numbers in five horses, and we propose to describe it in detail.

SIZE AND SHAPE. A small species which could at once be distinguished with the naked eye from members of the GENUS *Cylicostomum*, with which it was always associated, by the fact that it had a black and white appearance, the coils of the gut standing out clearly on account of their dark contents. One male and nine females were measured. The male was 7 mm. in length, and the females varied from 8.5 to 10.5 mm., average 9.2 mm.; the greatest breadth was, in the male, 156 μ , and averaged in the females 200 μ .

HEAD. The head is separated from the body by a well-marked neck (fig. 1).

Mouth collar. Sharply marked off from the rest of the skin by a deep constriction. The mouth is circular in transverse section.

Head papillae. Submedian, fairly stout conical projections reaching as far anteriorly as the external leaf crown; lateral, projecting somewhat beyond the mouth collar.

Mouth capsule. Circular in transverse section. It is a highly complicated structure, more closely resembling the state of affairs seen in *Tridentophorus* than that in *Cylicostomum*. It consists of two portions, firstly an extra-oesophageal part, the true buccal

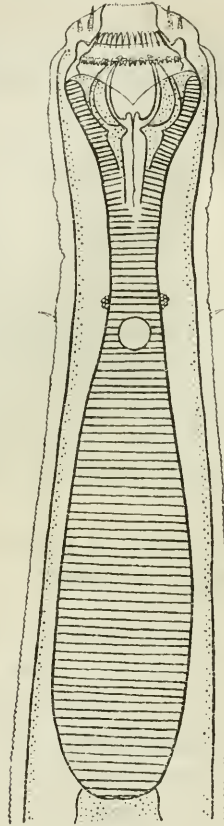


FIG. 1. *Gyaloccephalus capitatus*, Looss.

Anterior extremity, ventral view, $\times 90$.

capsule comparable with that occurring in the GENUS *Cylicostomum*, and secondly an intra-oesophageal portion formed by the chitinisisation of the oesophageal funnel. The anatomy of the buccal capsule (especially of the intra-oesophageal portion) is so complicated that it can hardly be understood without the aid of transverse and longitudinal sections. Diagrams of transverse sections through different levels are given in fig. 4. *a-f*, and of a longitudinal section in fig. 5.

The walls of the extra-oesophageal portion of the buccal capsule consist anteriorly of a thick chitinous ring which becomes thinner posteriorly and extends backwards over the anterior portion of the oesophageal funnel as three delicate triangular prolongations,

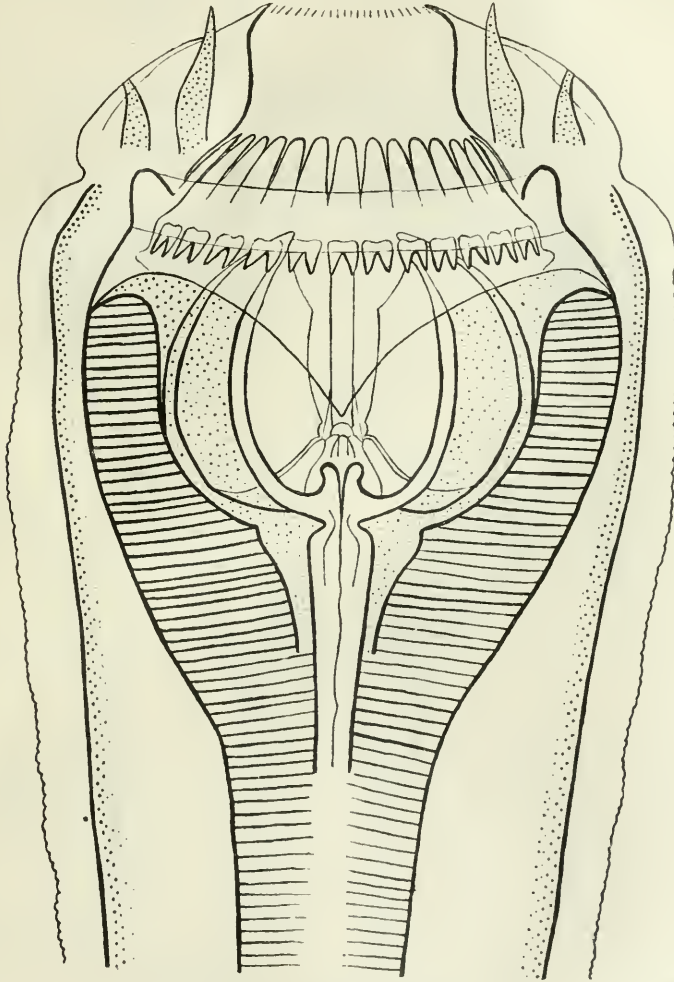


FIG. 2. *Gyaloecephalus capitatus*, Looss.

Head, ventral view, $\times 360$.

the apices of which coincide, not with the median lines of the three divisions of the oesophagus as stated by Looss, but with the points of contact of these three divisions (figs. 2 and 3).

The intra-oesophageal part is a hemispherical cavity, into which project from the wall three wedge-shaped septa (*vide* fig. 4. c).

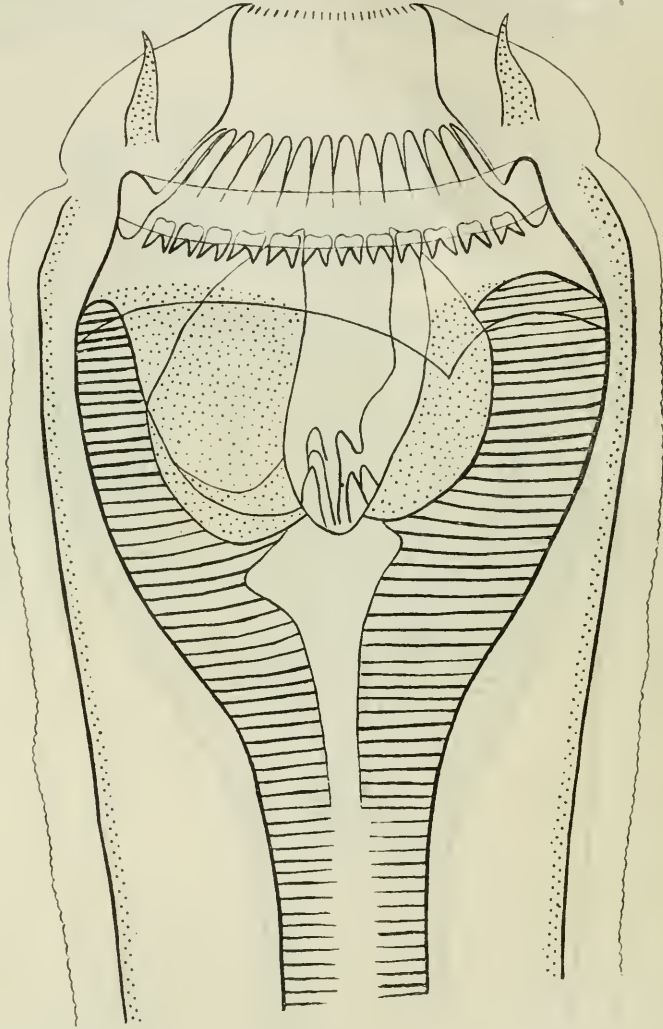


FIG. 3. *Gyaloccephalus capitatus*, Looss.

Head, lateral view, $\times 360$.

These wedges represent the continuation upwards of the three oesophageal segments. Each process extends anteriorly to about the level of the posterior margin of the true buccal capsule and there

terminates as a tooth (fig. 4. *b* and fig. 5). At the base of the chitinised oesophageal funnel are three pairs of chitinised ridges forming the edges of the triradiate cavity of the oesophagus (fig. 4. *e*.) These ridges are crescentic in form; following the base of the oesophageal funnel externally they are lost in the wall of the cavity, but internally they project anteriorly as six pointed teeth (fig. 4. *d* and fig. 5).

The antero-posterior diameter of the mouth capsule, measured from the anterior opening of the true buccal capsule to the base of the chitinised oesophageal funnel, was in the male 108μ , and in five females it varied from 123μ to 132μ , average 128μ ; the lateral diameter at the anterior opening of the true buccal capsule was in the male 105μ ; in the females it varied from 123μ to 136μ , average 127μ . The ratio of the lateral diameter of the anterior opening of the mouth capsule to the antero-posterior diameter is 1 to 1.

Dorsal oesophageal gutter. There is no dorsal oesophageal gutter.

Leaf Crowns. The external leaf crown consists of numerous minute slender and pointed elements arising from the mouth collar. The internal leaf crown consists of thirty-two large and stout elements originating from the inner surface of the true buccal capsule. Posteriorly each element terminates in two root-like processes, giving rise to the 'cogwheel' or 'battlement' appearance referred to by Looss (figs. 2 and 3 and fig. 4. *b*).

OESOPHAGUS. The most striking character of the genus is the peculiar formation of the anterior end of the oesophagus. It dilates into a large cup-shaped cavity lined by chitin, and armed with teeth in the manner already described. So marked is this dilation that the anterior end of the oesophagus almost completely fills the worm. Posterior to the dilation the oesophagus becomes very narrow, while immediately behind the nerve ring it again enlarges. The whole oesophagus resembles in shape an *Indian club*, the swollen anterior portion representing the handle of the club (fig. 1).

The length measured from the anterior extremity of the cup-like dilation to the posterior end was in the male 882μ ; in five females the length varied from 926μ to $1,026\mu$, average 982μ ; the greatest breadth of the posterior expansion was in the male 156μ , the

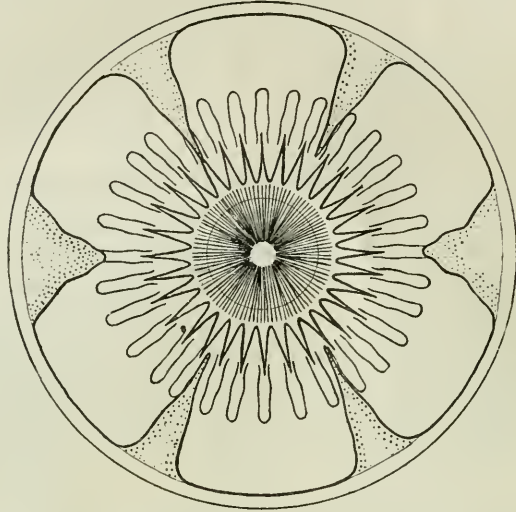
FIG. 4 a-f. *Gyalocephalus capitatus*, Looss.Transverse sections through the anterior extremity, $\times 360$.

FIG. 4a. Section through the anterior part of the true buccal capsule showing the external and internal leaf crowns.

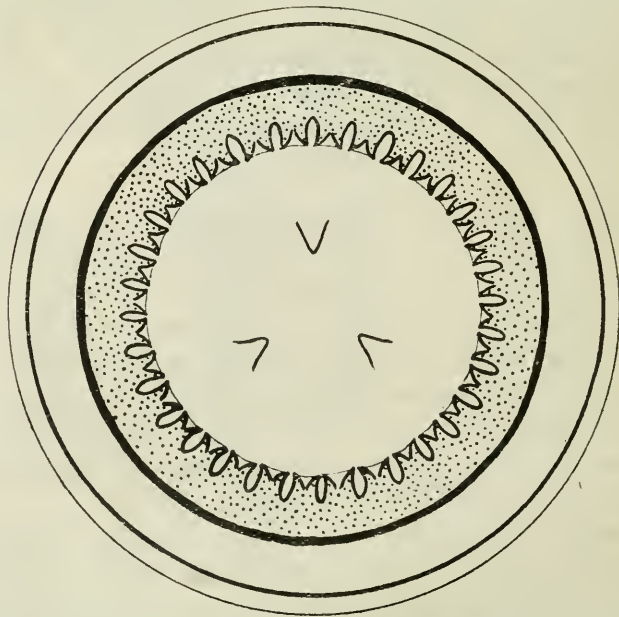


FIG. 4b. Section through the posterior part of the true buccal capsule at the level of the roots of the posterior leaf crown, showing the tooth-like anterior extremities of the three septa.

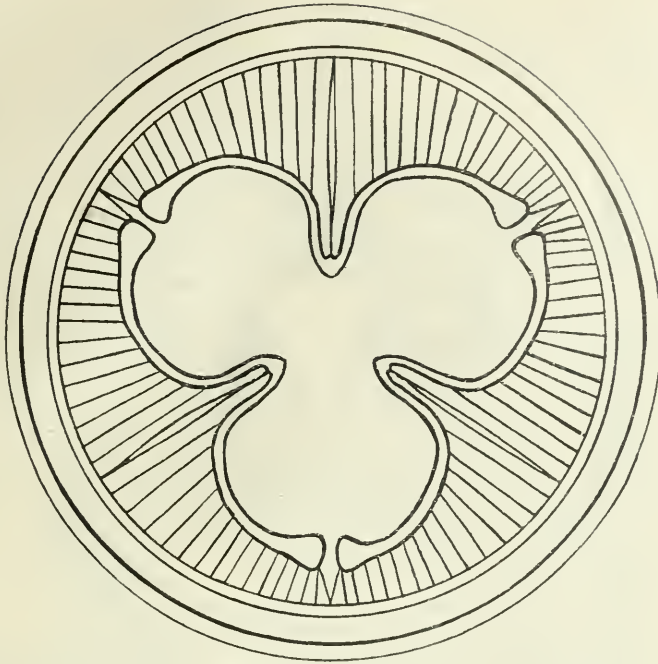


FIG 4c. Section through the anterior part of the intra-oesophageal portion of the mouth capsule, showing the three septa.

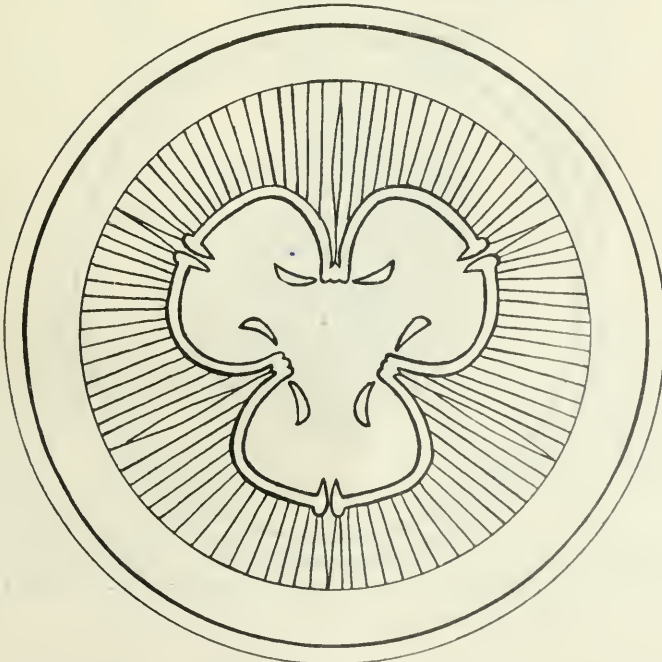


FIG. 4d. Section through the lower part of the intra-oesophageal portion of the mouth capsule, showing the tooth-like terminations of the three pairs of chitinated ridges which guard the entrance to the triradiate oesophagus.

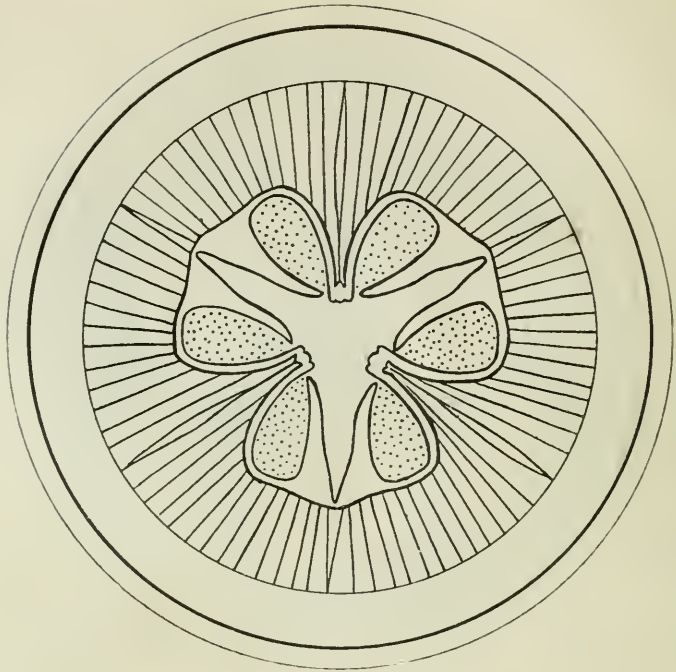


FIG 4e. Section through the base of the intra-oesophageal portion of the mouth capsule, showing the three pairs of chitinised ridges which guard the entrance to the triradiate oesophagus.

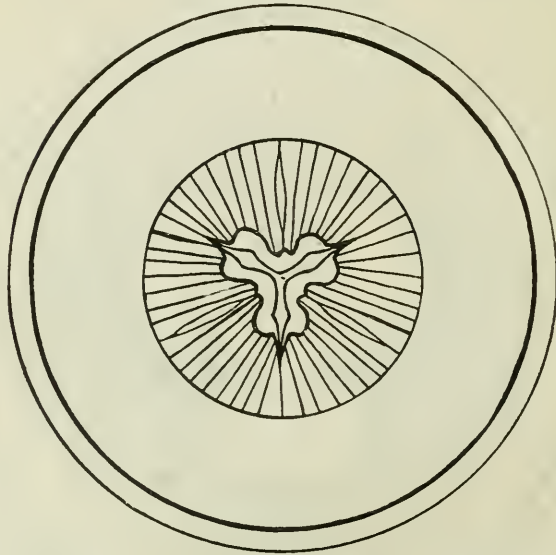


FIG. 4f. Section through the narrow neck of the oesophagus, showing the triradiate cavity.

average greatest breadth in the females was 200μ . The ratio of average greatest breadth to average length was in the male 1 to 5.6, and in the female 1 to 4.9; and the ratio of the length of the oesophagus to that of the worm was in the male 1 to 8, and in the female 1 to 9.

EXCRETORY BLADDER. Lies just behind the nerve ring over the narrow portion of the oesophagus. The distance of its posterior margin from the posterior extremity of the oesophagus varied in six worms from 557μ to 664μ , average 594μ .

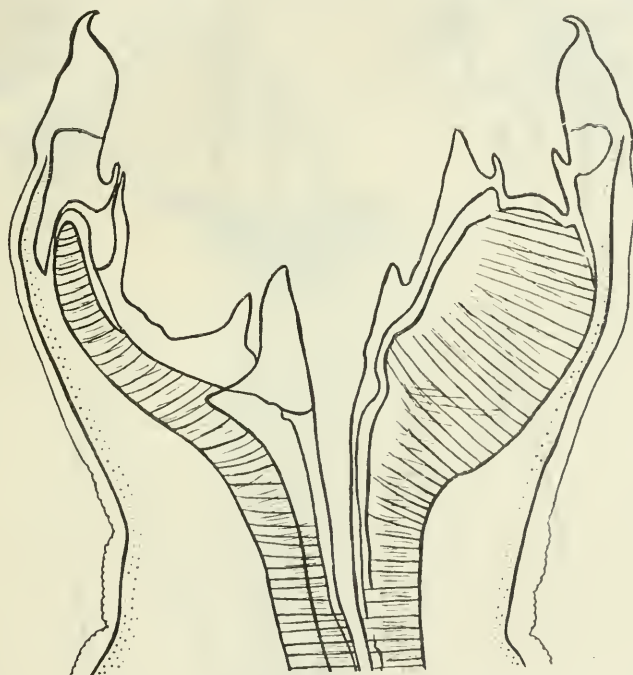


FIG. 5. *Gyaloecephalus capitatus*, Looss.
Longitudinal section through the head, $\times 360$.

CERVICAL PAPILLAE. These lie at the level of the excretory bladder.

POSTERIOR EXTREMITY OF MALE. The body tapers gradually to the bursa. The dorsal lobe of the bursa is triangular in shape, being more than a semicircle; the lateral lobes are distinctly marked off from the dorsal lobe and are voluminous, embracing the cone ventrally (fig. 6).

The anterior, antero-external and median rays all arise from a

Fig. 6

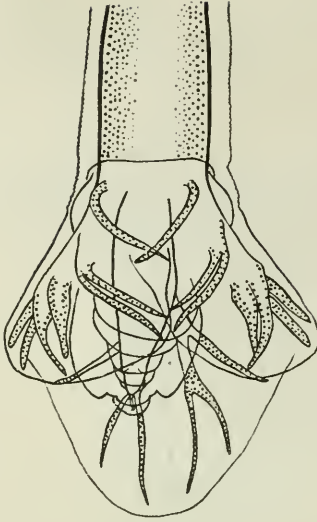


Fig. 7

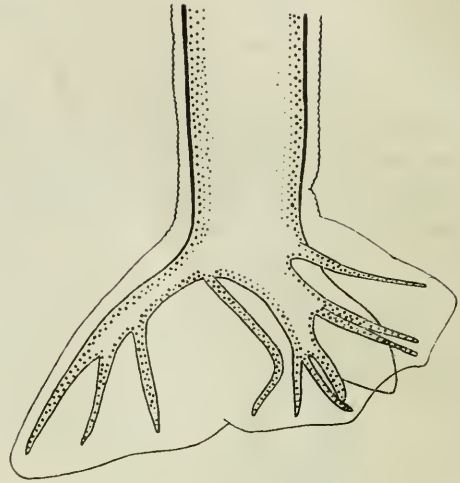


Fig. 8

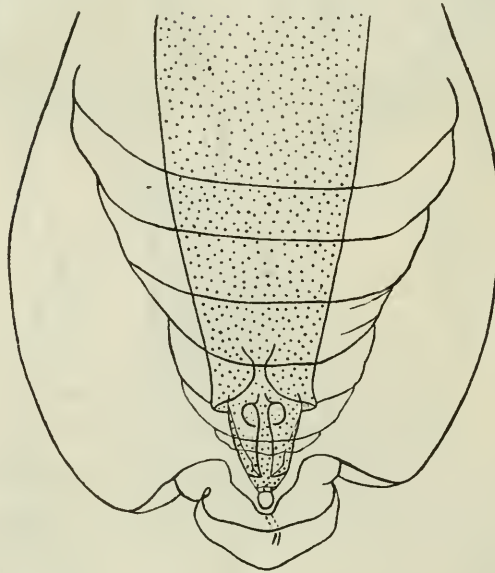
FIGS. 6-8. *Gyalocephalus capitatus*, Looss.

FIG. 6: Posterior extremity of male, ventral view, $\times 90$. FIG. 7: Posterior extremity of male, lateral view, $\times 90$. FIG. 8: Genital cone and appendages, ventral view, $\times 360$.

common trunk. The anterior ray is cleft to its point of origin from the common trunk. The antero-external arises just before the point of bifurcation of the median ray. The postero-external arises at the root of the dorsal ray, it runs at first parallel with the median ray and then bends dorsally. The dorsal ray bifurcates after a short course, and each main branch gives off two lateral sub-branches. The pre-bursal papillae are strikingly long, and are in this worm true rays in that they support the anterior portions of the lateral lobes of the bursa which, as mentioned above, are very voluminous completely embracing the genital cone ventrally (figs. 6 and 7).

The length of the main trunks of the posterior ray, from the tip to the point of origin of the postero-external rays, was 363μ . The ratio of the length of the main trunks of the posterior ray to the length of the male worm is 1 to 19.

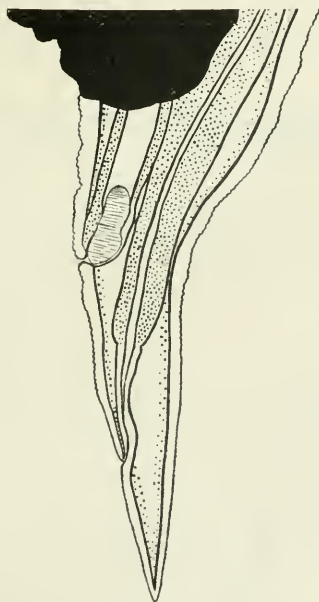


FIG. 9. *Gyaloccephalus capitatus*, Looss.

Posterior extremity of female, lateral view, $\times 90$.

Genital cone. This structure is prominent, it runs obliquely posteriorly and ventrally from the end of the body and reaches as far as the free margin of the lateral lobes of the bursa. The dermal collar is fairly well developed ventrally, but only slightly so dorsally. There is a remarkable cuticular expansion on each side of the genital cone, extending from its base to the tip (fig. 8).

Spicules. We were unable to determine the character of the spicules in the single specimen available.

POSTERIOR EXTREMITY OF FEMALE. The end of the body is straight and tapers slightly to the tail. The tail, which is slightly demarcated from the body, is straight, very long and slender (fig. 9). In five worms the distance between the anus and the vulva varied from 301μ to 414μ , average 369μ , and the distance measured straight along the middle of the tail, from the tip to a line drawn horizontally through the anus, varied from 203μ to 298μ , average 244μ .

REFERENCE

- Looss, A. (1901). The Sclerostomidae of Horses and Donkeys in Egypt. *Records of the School of Medicine, Cairo*, Vol. I.